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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/566,264	04/17/2007	Aharon J. Agranat	31316	3491

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EXAMINER	
CHANG, AUDREY Y	
ART UNIT	PAPER NUMBER
2872	

MAIL DATE	DELIVERY MODE
02/26/2010	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/566,264	AGRANAT ET AL.	
	Examiner	Art Unit	
	Audrey Y. Chang	2872	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *23 December 2009*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-41* is/are pending in the application.

4a) Of the above claim(s) *1-23* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *24-41* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *1/30/2006*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Remark

- This Office Action is in response to applicant's response filed December 23, 2009, which has been entered in the file.

Election/Restrictions

1. Applicant's election without traverse of Group II claims 24-41 in the reply filed on December 23, 2009 is acknowledged.

2. Claims 1-23 are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected invention group, there being no allowable generic or linking claim. Election was made **without** traverse in the reply filed on December 23, 2009.

3. Claims 24-41 remain pending in this application.

Claim Rejections - 35 USC § 112

4. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

5. **Claims 24-41 are rejected under 35 U.S.C. 112, second paragraph**, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

The phrase "for particular application" recited in claims 24 and 41 is confusing and indefinite since it is not clear what is this "particular application".

The phrase "determining a birefringence grating" recited in claim 24 is confusing since it is not clear what *physical structure* is considered to be "birefringence grating". Or it is not clear the "birefringence grating" is consisted of what structure. It is also not clear what *properties* needed to be "determined" in order to form this "birefringence grating".

The phrase "determining a concentration grating" recited in claims 24 and 41 is confusing and indefinite since it is not clear the "concentration" is the concentration of **what**? It is also not clear what *physical structure* does the "concentration grating" have?

It is also not clear what is the *structural relationship* between the "concentration grating" and the "birefringence grating"? How does the concentration grating yield the birefringence grating? By definition, "birefringence" means the material has different refractive indices in different orthogonal axes of the material so that the light propagates along different axis of the material will travel at different speed. It is not clear how does the "concentration" (it is not clear the concentration of what), to even give birefringence property.

The scopes of the claims are also confusing since there is no logical and structural relationship between the "electrically controlled Bragg grating" and the "concentration grating" and/or the "birefringence grating".

With regard to claim 30, it is not clear how does ht "growth solution" relate to the electro-optical crystal.

With regard to claims 32 and 34, it is not clear how the "growth crucible" relate to the electro-optic crystal or the growth method.

With regard to claims 35-37, it is not clear how the rotation of the electro-optic crystal could be rotated before the crystal is being grown. The rotation of the crystal is to achieve the temperature modulation in the growth process, it is not clear that before the crystal is being grown how temperature modulation is being achieved. There is yet any crystal to be rotated.

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

7. **Claims 24-41 are rejected under 35 U.S.C. 103(a) as being unpatentable over the patent issued to Magel et al (PN. 5,171,400) in view of the patent issued to Yin et al (PN. 6,563,985).**

Magel et al teaches, with regard to claims 24 and 41, a method for producing periodic structure in an electro-optic crystal that is comprised the steps of growing the single electro-optic crystal by *periodically* changing or modulating the growth rate including the periodically modulating the temperature and pulling rate, (please see Figures, 1 and 2, column 4, lines 19-35, column line 41 to column 6, line 40).

This reference has met all the limitations of the claims with the exception that it does not teach explicitly that the periodic structure formed in the electro-optic crystal by growth process is a comprised of a birefringence grating, a concentration grating and/or an electrically controlled Bragg grating. **Magel** et al teaches that the electro-optic crystal is lithium niobate ($LiNbO_3$, please see column 2, lines 35-37). Lithium niobate it is known in the art that it implicitly has birefringence property. The periodic structure formed by growing the lithium niobate crystal that has different or reversed ferroelectric properties may form periodic structure with birefringent properties. The periodic modulation of the growth rate may certain result periodic concentration variation in the resultant crystal. This reference however fails to teach that the periodic structure is a grating. **Yin** et al in the same field of endeavor teaches to holographically written Bragg grating in lithium niobate crystal ($LiNbO_3$, please see column 2, lines 29-40). This means that it is well known in the art to form electrically-controlled Bragg grating in the electro-optic crystal such as $LiNbO_3$. It would then have been obvious to one skilled in the art to make the periodic structure caused by the periodically modulating the growth rate of the electro-optic crystal as periodic grating or Bragg grating for the benefit of making crystal growth method applicable to store electrically-controlled Bragg grating in the electro-optic crystal *permanently*.

With regard to claims 25-29 and 38-40, Magel et al teaches that the modulation of the growth temperature is achieved by laser heating process, (please see Figure 2A). The heating is periodically applied and similarly the non-heating or cooling is also periodically applied so that the growth temperature is also periodically modulated. The pulling rate is also periodically modulated with respect to the growth temperature modulation as shown in Figure 2C. Although this reference does no teach explicitly about the specific temperature changing rates as claimed, the modifications to utilize the specific rates would have been obvious to one skilled in the art, since it has been held when the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. In re Aller, 105 USPQ 233.

With regard to claims 30-37, Magel et al teaches to store periodic structure in an electro-optic crystal by periodically modulating growth rate by modulating the growth temperature and/or pulling rate. The periodical modulation of the growth temperature is achieved by periodically heating however it does not teach the temperature modulation can also be achieved by stirring the growth solution, rotating the growth crucible or rotating the crystal itself. However one skilled in the art must know that by changing the crystal growth environment, such as stirring and rotation would cause additional energy to be delivered into or extracted out from the growth environment which therefore would change the growth temperature. Such modifications would then have been obvious to one skilled in the as alternative ways to achieve the same temperature modulation.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Audrey Y. Chang whose telephone number is 571-272-2309. The examiner can normally be reached on Monday-Friday (9:00-4:30), alternative Mondays off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stephone B. Allen can be reached on 571-272-2434. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Audrey Y. Chang, Ph.D.

/Audrey Y. Chang/
Primary Examiner, Art Unit 2872